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Device for the examination of the fillingdense of one with blow up

material filled detonation cord the invention relates to a device in accordance with the preamble of the claim 1.

With a known device for examination the fillingdense of the explosive filled into a detonation cord becomes a propulsion system of the device stopped, if over a monitor, which the filling amount of the cord checked, which does not become being present one desired density found, whereby the device in addition an analyser with a radioactive Sr-90 exhibit sources. This device has the subsequent disadvantages: When turning off the flaw must become referred with hand. The cord must become totally enclosed at the ends of the flaw cut and. The device for the examination of the fillingdense to cutting and capsules of the defective part, working with a radioactive source, does not require manual pulling Schnur. Der unreeled part can here tested become, since set when turning the propulsion system off the radioactive source Sr-90 becomes automatic except operation.

The radioactive source is coupled to purposes of a test procedure, and/or. in operation set, exists due to the manual drive and/or. Pulling the cord the hazard that the operator becomes radiation exposed.

Without radioactive control unit defective part of the cord cannot be determined with this known device of the operator. Furthermore is for eliminating the defective cord part after the encapsulated one of the tying at that location, at which the defect is present and for reimporting the cord into the device it required, 5 m a prolonged piece unexamined cord to complete, which then waste forms, since concerning this piece of cord no possibility of the control exists for the fillingdense of the explosive.

Both the procedures for the restoration of the conditions for a restarting of the device, for capsules and/or. The encapsulated tying, unreeling the cord from the completion drum, for pulling the cord over the guide rollers of the device, rolling the cord up in particular manner on

roles of a Antriebsmotore, determining the cord on the rolling up drum and stretching the cord between completion drum, motor and rolling up drum is difficult and requires a considerable manual labor as well as longer stopping of the whole apparatus.

Finally a device is known to the production of a detonation cord, which a monitoring and a control unit for the fillingdense of the detonation cord exhibits, whereby a monitor with P-jets steers the rate of admission of the cord continuous checked and dependent of the examination a reduction or a magnification of the amount of the pyrotechnic material, which into the cord introduced becomes, by reduction or by increase of an air pressure quantity, with their assistance fillings of the cord made.

The invention is the basis the object to create a device that initially mentioned type which the foregoing indicated disadvantages and difficulties eliminated.

This object becomes according to invention by the characterizing part of the claim 1 dissolved.

Other embodiments result from the Unteransprüchen.

The device for the examination of the fillingdense at pyrotechnic material exhibits a completion drum and a receiving drum for the checked cord as well as drive rolls.

Furthermore a radioactive source are provided for cord examination and a detecting unit for the fillingdense.

To the examination of the filling and/or. Fillingdense at pyrotechnic material is a device to the mark of the defective cord part of disposed, which becomes controlled by a sensor provided with an ionization chamber. The marking unit exhibits acoustic signalling equipment and a recording device for the lengths of the defective cord parts. The mechanism to the mark becomes controlled by a test unit controlling the mark.

To the shutdown of the device and/or. the drive motor is a parking installation provided, which becomes activated, like that-- soon a predetermined ratio between defective and defective cord-prolonged is not exceeded.

By the device according to invention favourable-proves achieved becomes that a continuous examination is the fillingdense of the cord ensured filled with explosive.

Cutting the cord, completing a completion drum, pulling the cord through by the device and over drive rolls to the rolling up drum of the tested cord, capsules of the ends of the defective cord and the restarting of the Antriebsmotore and/or. the device is here eliminated.

Furthermore no hazard exists by irradiation of the operator, since the operator of the radioactive

strontium liquid manure 90 does not have to approach.

Finally a saving at raw materials and materials becomes achieved. The device for the examination of the fillingdense of a detonation cord filled with explosive works beyond that with small effort and reliable.

In the following preferable embodiments of the device become described on the basis the drawing the explanation of other features. Show: Fig. 1 an illustration in principle of the device with radioactive source for the examination of the fillingdense of a detonation cord filled with explosive, Fig. 2 a known control, Fig. 3 a control according to invention in more schematic Illustration, Fig. 4 a schematic illustration electric and pneumatic signals follows with a known Device during the examination fill the dense detonation cord filled with explosive, Fig. 5 a schematic illustration of the electric Signal sequences with the invention during the over examination of the fillingdense, Fig. 6 an illustration of the pneumatic propulsion one Printer to the mark of defective cord parts of according to the invention, and Fig. 7 a schematic illustration of a control for the device according to the invention.

In accordance with fig 1 the fillingdense of a detonation cord becomes this cord 1 of a supply and/or with a device the examination. Completion drum 2 unreeled, by means of a drive roll 4. The cord 1 becomes over guide rollers 5, 6, 7 and tension rollers 8, 9 an admission and/or.

Rolling up drum 3 guided. The cord 1 is led past a radioactive source 10, which is before an ionization chamber 11 and which the fillingdense of the cord represents a sensor for the examination.

If a defect arises, transfers the sensors existing from the ionization chamber 11 a signal, which controls a turning of the device off and a dipping the headlights of the radioactive source 10; subsequent becomes the defective cord part of eliminated.

The device for the examination of the rate of admission of the cord is provided with a mechanism to the mark of the entire defective cord part with colour. Markierungsein direction consists of a printer 12 and a support roller 13, which carry the cord 1 during the mark. The printer 12, which exhibits a pneumatic propulsion and a double time delay, converts a corresponding electrical signal of the sensor 11 with the radioactive source 10 for the fillingdense of the explosive with the help of an electro-pneumatic transducer 14, 15, 16 with the occurrence of a cord defect into a pneumatic signal from 0 to 3 bar, which steers a servomotor, which serves 12 for the movement of the printer to the cord near. Thus the made mark e.g. white cord with a pressure fluid of for example black colour on the whole length of the defective cord part.

With the occurrence of a defect due to an error in the fillingdense of the cord the device

becomes and/or. the propulsion not stopped and dipping the headlights the radioactive source not controlled, but it becomes further the operation of the device ensured, whereby the mark of the defective part of the cord on the whole errorprolonged made. After complete completing of the cord 1 of the completion drum 2 on the rolling up drum 3 the defective parts will become only in the case of the supply of the cord by cuts eliminated and the tying totally enclosed, whereby the lengths required of the customer are kept.

Those bottom reference on Fig. 1 described apparatus contains preferably an acoustic message for warning of the operator with the occurrence of a defect, i.e. from the occurrence to the completion of the defect with a sound alarm unit of 17 with a level of 40 decibels, whereby the sound level is more adjustable between 20 and 60 decibels.

The sound alarm unit becomes with a stress of 220 V, 50 hzs fed and during the whole durations of the defect activated.

Registering the defective cord-prolonged in centimeters, for marking the technical quality control and examining the quality of the portions and the end of the defective cord parts of the checked cord made with an electronic integrator 18 (Fig. 7) with a corresponding constant for the cord-prolonged, expressed in centimeters, which during the whole durations of the cord defect, i.e. over the length of the cord defect, selective of the electrical signal of the sensor 11 controlled becomes.

Registering the maximum cord-prolonged in metres of the cord made defective by a wrong or inaccurate fillingdense, in order to avoid a wasting from material and raw materials to, if defects by completion of the supply or by interruption of the supply of explosive into the container by a failure, by which and/or by the carelessness of the personnel arise to turning the device off. After exceeding of a predetermined length of defective cord the device becomes automatic stopped by a time relay, that in a certain distance in the electric chamber and/or. Unit disposed and up to a certain value dependent of the operation of the device, e.g. of time test speed - length is more adjustable. The time relay is controllable the cord tested by an electrical signal with the occurrence of a defect in.

The continuous control of the printing process, whereby going through becomes more defectively and not labeled cord by the device avoided, if a defect signal arises, which printing the cord on causes or if the mark can not take place due to a defect arisen with the printer 12 or due to lack at pressure fluid in the supply container, becomes by automatic turning of the device off by means of a control unit 19 for the printing their function due to Differentiation between the appearance of the correct and/or. white cord and the defective, with black labeled part ensured. The control unit 19 for the printing works continuous. If with the occurrence of the defect signal the control unit 19 does not become by the optical electronic system being present the mark of the defective part on the cord confirmed, turning the device controlled off. This condition has a restrictive character for the function of the device.

Fig 1 shows the structure of the device according to invention with the foregoing described individual elements in schematic illustration, from which apparent is that a cord of a completion drum 2 over the roles 8, 7 runs, then by the sensor 11 passes through and other over roles 6, 5, 12 disposed between which a Gegenrolle is 13 for an opposite printer, over the roles 9 and 4 the rolling up drum 3 passed becomes.

Fig 5 shows the various, with present device arising signals in a time chart. In the schematic illustration "defect" is shown the occurrence of a cord defect dependent of the time, whereupon the subsequent durations of the cord drive and furthermore as "starting with the Handantrieb" the times, at which the device is to be set by hand again in operation.

In addition the corresponding defect is made mark of the detonation cord illustrated, likewise dependent of the time by "cord mark", furthermore as "time of the mark" the period, made within which the mark becomes regarding the defects. Then a signal sequence shown, which shows the acoustic message, is furthermore the "cancellation of the acoustic message" as "acoustic message", which means that becomes made with the signals represented there no acoustic message.

The automatic control of the mark indicates the signals and time span, becomes made in which regarding the defects an automatic control of the mark. Finally is dipping the headlights the radioactive source, i.e. their putting out of operation in dependency of the defects shown and the time intervals, the defective cord-prolonged made within which become the registration. As comparison for this Fig shows. 4 appropriate signals with a device to the state of the art.

Fig 6 is a schematic illustration of parts of the printer unit with associated elektosneumatischer control, whereby with 14 a part of the electropneumatical transducer is illustrated, with 15 and 16 other parts of the transducer. Dependent 16 signals generated of over the transducers 14, 15, the printer 12 with the role 13 operated becomes.

Like apparent, the role 13 stands in a marking liquid and can become dependent of for example a pneumatic pressure applied to the printer 12 against the cord 1 the embodiment of a mark moved.

Fig 7 shows a schematic block diagram of the device according to invention. From fig 7 is apparent that the main supply, i.e. As well as supply at with "total stop" referred unit guided is, those the roles 3, 4 steers for its part dipping the headlights the radioactive source and/or.

Zuschaltung of the radioactive source and by output signals of the control units 19 and 20 controlled is, whereby the unit 20 forms an unit for turning the device off. Furthermore from fig 7 is apparent that with the illustrated embodiment of the sensors an input signal receives 10 from the unit "circuit of the radioactive source" and steers the radioactive source 11. The radioactive source 11 for its part emits a signal to an unit for the "marking time", which affects a

Meldeinheit 17 and the printer 12 for its part. Furthermore the radioactive source gives 11 Signals to the registration unit 18 and the latter is located in connection with the storage unit 20. The printer 12 is located in connection with the control unit 19.

A fig 7 associated control circuit is in fig 3 shown, whereby fig 3 units referred the assigned the single functions.

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Claims 1. Device for the examination of the fillingdense of one also

Propulsion, tension rollers, a radioactive source with one roll explosive filled detonation cord, with a supply drum for the cord, to a receiving drum,

Sensor to testing the fillingdense of the cord, D A D u r C h characterized that a mechanism (12 to 16) to the mark that

Cord (1) dependent of that an ionization chamber on pointing sensor (10) provided is, which by the radioactive source (11) activated becomes.

2. Device according to claim 1, D A D u r C h g e k e n n z e i C h n e t that the mechanism (12 to 16) to the mark blow up cord (1) an acoustic Meldeinheit (17) and a registration unit (18) for defective cord-prolonged (1) exhibits.

3. Device according to claim 1 or 2, D A D u r C h characterized that a mechanism (19) to the control and/or. Over being awake the cord marks provided is.

4. Device after one of the aforementioned claims, D A D u r C h g e k e n n z e i C h n e t that a mechanism (20) is prolonged provided for operating interrupt with exceeding of a pre-determined, defective cord.